

5.0 MOTORIZED TRAVEL CONDITIONS

Roadway Network

Palomar Gateway District is regionally accessed via Interstate 5 and Palomar Street. The principal roadways in the project study area are described briefly below. The description includes the roadway classification, physical characteristics and adjacent land uses.



Palomar Street is classified as a 6-lane Major Arterial between I-5 and Broadway in the City of Chula Vista Circulation Plan – West. Palomar Street is currently constructed as a 4-lane roadway between the I-5 ramps, 5-lane roadway between the I-5 NB ramps and Walnut Avenue, and as a 6-lane roadway between Walnut Avenue and Broadway. The posted speed limit is 35 mph and parking is prohibited. The Palomar Transit Center is located at the southeast quadrant of the Palomar Street / Industrial Boulevard intersection and includes an at-grade rail-road crossing at this intersection.

The land uses on Palomar Street include a variety of commercial and retail establishments between I-5 and Broadway. Between I-5 and Industrial Boulevard, the land uses on Palomar Street include an Arco gas station on the north side, Palomar Inn on the south side and other retail uses. East of Industrial Boulevard, the primary land uses on Palomar Street are commercial/retail. Recent street and safety improvements in this area have been completed, consisting of landscaped medians, enhanced paving at the intersection of Palomar Street and Industrial Boulevard, and sidewalks and tree-lined parkways, including bike lanes along Palomar and Industrial Boulevard.

Ada Street is an unclassified east-west roadway in the City of Chula Vista Circulation Plan – West. Ada Street is currently constructed as a 2-lane roadway. This east-west street is fully improved with sidewalks, curbs and gutters and parking is allowed on both sides of the street. The land uses on Ada Street include several new residential developments consisting of a mix of multi- and single-family units. There are also vacant and underutilized parcels, which have potential for additional development.



There has been significant new development along Ada Street such as the Trolley Terrace Townhomes (18 units) and Trolley Trestle Apartments (11 units). As a part of calming traffic, a “roundabout” was recently constructed at the Ada Street/Industrial Boulevard intersection. These

improvements were part of the \$2.1 million SANDAG Palomar Gateway Enhancement project Smart Growth Improvement Program (SGIP).

Dorothy Street is an unclassified east-west roadway in the City of Chula Vista Circulation Plan – West. Dorothy Street is currently constructed as a 2-lane undivided roadway connecting Frontage Road to Industrial Boulevard. The adjacent land uses on Dorothy Street are residential units.

Industrial Boulevard is an unclassified north-south roadway in the City of Chula Vista Circulation Plan – West. Industrial Boulevard is currently constructed as a 2-lane roadway north and south of Palomar Street. Industrial Boulevard, north of Palomar Street, includes residential land uses on the west side bounded by the railroad tracks on the east. The speed limit on Industrial Boulevard is 40 mph.

Walnut Avenue is an unclassified north-south roadway in the City of Chula Vista Circulation Plan – West. Walnut Avenue, a 2-lane undivided roadway is currently built only on the north side of Palomar Street terminating into a cul-de-sac. Walnut Avenue is characterized by a mixture of uses, including residential, commercial, and industrial. Current uses include retail stores, an Arco gas station, auto towing and storage yard, the Palomar Motel, office building, and residences north of Palomar Street.

Frontage Road is an unclassified 2-lane undivided roadway and constitutes an extension of Anita Street at the southerly end, as it extends along the western edge of the district parallel to I-5, and connects to Palomar Street at the northerly-end. It is a narrow street without street improvements; an asphalt curb serves as edge between the street and private property. Frontage Road provides access to the industrial uses at the corner of Anita Street, and residential properties that front it.

Trenton Avenue is an unclassified north-south roadway in the City of Chula Vista Circulation Plan – West. Trenton Avenue, a 2-lane undivided roadway is currently built on the north side of Palomar Street terminating into a cul-de-sac. The adjacent land uses are residential.

Anita Street is an unclassified 2-lane undivided roadway and serves as interface between residential uses on the north and commercial/industrial uses on the south side of the street. The north side is predominantly residential, except for industrial development on the most westerly lot, adjacent to I-5. There are no sidewalks, curbs, gutters on the north side of the street. Anita Street has an at-grade rail crossing but pedestrian facilities across the rail tracks were observed to be deficient. MTS plans to upgrade the Anita Street rail crossing to improve roadway and pedestrian connections in FY 2012/2013.

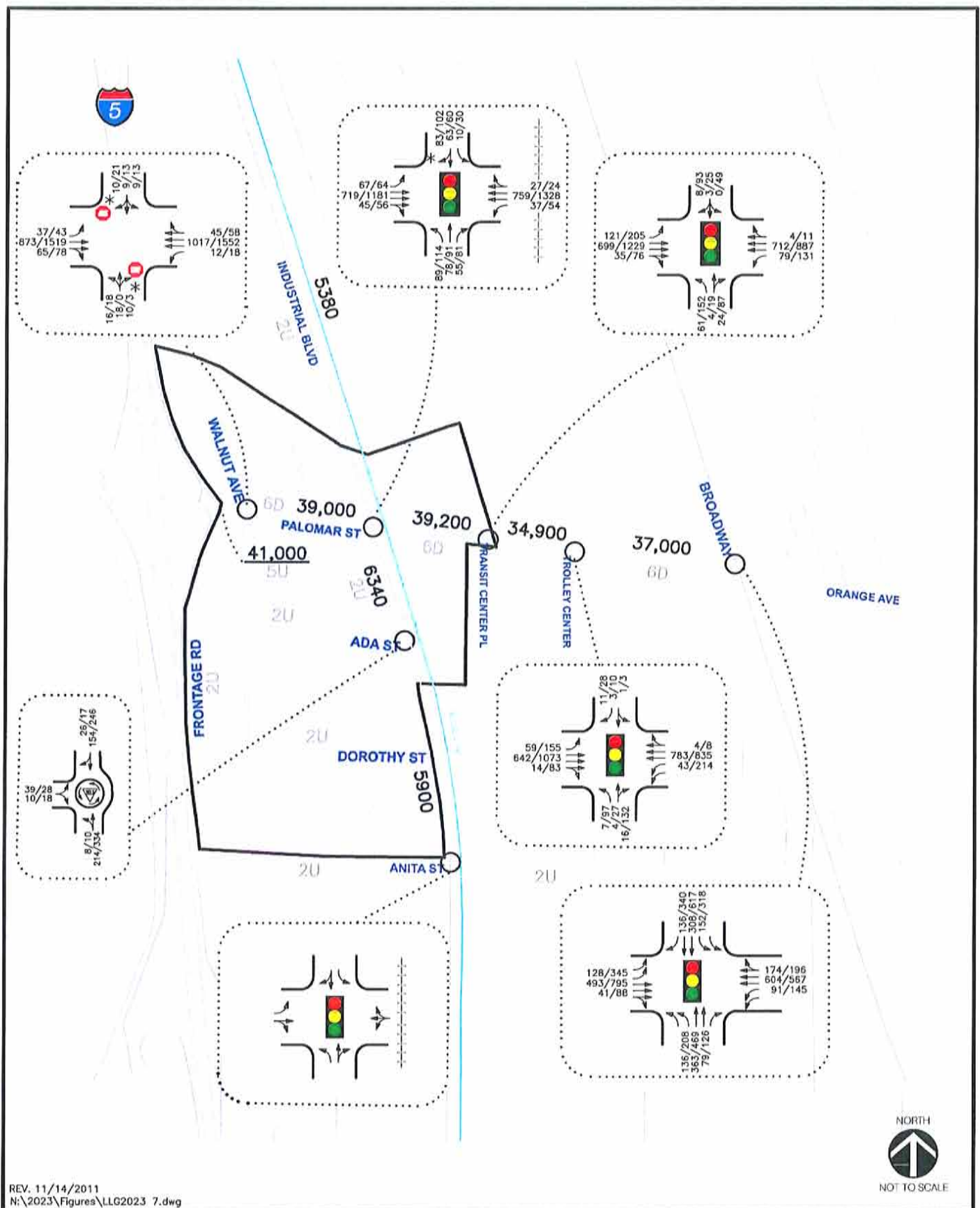
Traffic Volumes

Weekday peak hour intersection and bi-directional daily traffic counts on the street segments were collected from several sources including City of Chula Vista counts, the *Olson Bayvista Walk* Traffic Impact Study, and the *Palomar Gas and Carwash* Traffic Study. The sources contained counts

dating from 2005 to present. LLG conducted a count validation using a recent 2011 count at the Industrial Boulevard/ Palomar Street intersection.

Comparing traffic volumes for every movement at this intersection, the 2005 count was found to be generally higher than the 2011 count for both the AM and PM peak periods. As such, the 2005 counts for the study intersections were validated and used in this study. It was also decided to use the recent 2011 count data at the Industrial Boulevard/ Palomar Street intersection since this represents the most current data for one of the most critical intersections in this study. Slight adjustments were made to balance the 2011 counts with the 2005 counts at the adjacent intersections. As a part of the adjustments, the traffic volumes were always increased to be conservative.

Figure 7 contains the existing roadway conditions and traffic volumes. The traffic count data validation worksheet is contained in *Appendix E*.



Existing Operations

Intersection capacity analyses were conducted for the study intersections under Existing conditions. **Table 2** and **Appendix E** report the intersection operations during peak hour conditions. **Table 2** includes delays at the Palomar Street/ Industrial Boulevard intersection with the trolley crossing. All intersections are calculated to operate at LOS D or better with the exception of:

- Walnut Avenue / Palomar Street—LOS F—AM and PM peak periods

To confirm existing traffic operations, LLG conducted field visits at the project site. The intersection operation at Walnut Avenue/ Palomar Street was validated as the intersection is currently unsignalized and vehicles on Walnut Avenue experience excessive delay as they wait for gap on 6-lane Palomar Street. Further excessive queues were also observed on Palomar Street during trolley crossings, especially during disabled loading/ unloading maneuvers. To account for trolley delays, a delay factor was developed and added to the overall intersection delay. **Appendix G** contains a detailed description of this methodology.

TABLE 2
EXISTING INTERSECTION OPERATIONS

Intersection	Control	Peak Hour	Existing	
			Delay ^a	LOS ^b
1. Walnut Avenue / Palomar Street	TWSC ^c	AM PM	>100 >100	F F
2. Industrial Boulevard / Palomar Street (at-grade trolley) ^e	Signal	AM PM	39.8 ^e 44.4 ^e	D D
3. Transit Center Place / Palomar Street	Signal	AM PM	10.3 22.8	B C
4. Trolley Center / Palomar Street	Signal	AM PM	8.0 13.4	A B
5. Broadway / Palomar Street	Signal	AM PM	22.5 27.3	C C
6. Ada Street / Industrial Boulevard	Roundabout	AM PM	0.18 ^d 0.33 ^d	A A

Footnotes:

- Average delay expressed in seconds per vehicle.
- Level of Service.
- TWSC – Two-Way Stop Controlled Intersection. Minor street left-turn delays reported.
- Synchro does not present vehicular delays at roundabouts. Therefore, maximum volume to capacity ratio is reported.
- 24 seconds of delay added to account for the trolley crossings at this intersection. **Appendix G** contains further explanation of this methodology.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Existing street segment analyses were conducted for roadways in the study area. **Table 3** reports existing street segment operations on a daily basis.

During the arrival of the trolley, the gate closure time affects intersection capacity and thereby reduces the street segment throughput. Hence, to account for trolley delays, the street segment capacities on Palomar Street and Industrial Boulevard were reduced by 10%.

As seen in **Table 3** all street segments are calculated to operate at LOS D or better with the exception of Palomar Street between I-5 and Walnut Avenue, which is calculated to operate at LOS E.

TABLE 3
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Functional Classification	Capacity (LOS C) ^a	ADT ^b	V/C ^c	LOS ^d
Palomar Street					
I-5 to Walnut Avenue	5-Lane Major	35,000	41,000	1.171	E
Walnut Avenue to Industrial Boulevard (at-grade trolley) ^e	6-Lane Major	36,000 ^e	39,000	1.114	D
Industrial Boulevard to Transit Center Pl. (at-grade trolley) ^e	6-Lane Major	36,000 ^e	39,200	1.120	D
Transit Center Pl. to Trolley Center	6-Lane Major	40,000	34,900	0.872	B
Trolley Center to Broadway	6-Lane Major	40,000	37,000	0.925	C
Industrial Boulevard					
North of Palomar Street (at-grade trolley) ^e	2-Lane Collector	10,500 ^e	5,380	0.512	A
Palomar Street to Ada Street (at-grade trolley) ^e	2-Lane Collector	10,500 ^e	6,340	0.603	A
Ada Street to Anita Street	2-Lane Collector	12,000	5,900	0.491	A

Footnotes:

- a. Capacity based on *City of Chula Vista's* roadway classification operating at LOS C shown in *Appendix II*.
- b. Average Daily Traffic.
- c. Volume to Capacity.
- d. Level of Service.
- e. To account for the at-grade trolley crossing, segment capacity has been reduced by 10%.
- f. Industrial Boulevard analyzed using the Class II Collector roadway classification.

Trip Generation

LLG reviewed the market absorption study for the Palomar Gateway District for land use types, densities and location. LLG coordinated with City staff to validate this information and developed the following trip generation table based on the prescribed land use type and densities.

Table 4 summarizes the trip generation for the project. The PGD offers mixed-use and transit opportunities with planned pedestrian, bicycle connectivity and the adjacent Palomar Transit Center. Mixed-use and transit adjustments were applied, where applicable and without deviation, per the *SANDAG Trip Generation Rates*. Considering the project site is planned to be located within a dense suburban setting with many modal choices available, such an approach is considered conservative.

The Palomar Gateway District is subdivided into the following 4 sub-districts:

- MU-1: Palomar Transit Plaza / Transit Focus Area
- MU-2: Mixed-Use Corridor
- PRV: Palomar Residential Village/ Residential High
- PNRC: Palomar Neighborhood Retail Cluster / Commercial Retail

Section 2.0 includes a discussion of these land uses.

TABLE 4
PALOMAR GATEWAY TRIP GENERATION

Sub-Districts/ Land Use ^a	Quantity	Driveway Rate ^b	ADT ^c	
			Driveway	Cumulative
MU-1 : Palomar Transit Plaza / Transit Focus Area (3.5 acres)				
Residential	150 DU	8/DU	1,200	1,170
Retail	10,000 SF	40/ 1000 SF	400	340
Office	5,000 SF	20/ 1000 SF	100	90
Subtotal			1,700	1,600
MU-2: Mixed Use Corridor (31.5 acres)				
Residential	450 DU	8/ DU	3,600	3,490
Retail	85,000 SF	40/ 1000 SF	3,400	2,890
Office ^d	40,000 SF	20/ 1000 SF	800	770
Subtotal			8,100	7,150
PRV: Palomar Residential Village/ Residential High (43.5 acres)				
Residential	700 DU	8/ DU	5,600	5,440
PNRC: Palomar Neighborhood Retail Cluster / Commercial Retail (1.5 acres)				
Retail	5,000 SF	40/ 1000 SF	200	170
Office	5,000 SF	20/ 1000 SF	100	90
Subtotal			300	260
Floating Park (Total Acreage: 5 acres)				
Active Park	5 acres	50/ acre	250	240
Total			15,950	14,690
Mixed Use Credit (5%)			800	740
Transit Credit (10%)			1,520	1,400
Net New Trips			13,630	12,550

Footnotes:

- a. Land use quantities and densities provided by City of Chula Vista. The above table reflects only additional development over existing land uses.
- b. Trip Generation rates based on *SANDAG Not So Brief Guide Vehicular Traffic Generation Rates, April 2002*.
- c. ADT's rounded to nearest 10. Driveway trips represent trips entering/exiting the project driveways. Cumulative trips represent net new trips added to the external roadway network and are a subset of driveway trips based on SANDAG rates.
- d. A portion of the office land use may be substituted by a College/ Institution of comparable trip generation of 24 trips per 1000 SF.

Year 2020 Traffic Volumes & Operations

The future transportation analyses were conducted for two horizon years, Year 2020 and Year 2030. The following section discusses the traffic forecast volumes and traffic operations for each scenario. The recommendations are provided at the end these sections.

To develop Year 2020 volumes, the Year 2030 volumes were derived from the SANDAG Southbay traffic model (Baseline scenario). Year 2020 traffic volumes were then interpolated and developed based on existing and Year 2030 traffic volumes. The growth factor calculations are attached in *Appendix I*.

Based on the interpolated forecast ADT volumes, the Year 2020 peak hour volumes were calculated based on the existing relationship between ADT and peak hour volumes. The forecast volumes were also checked for consistency between intersections, where no driveways or roadways exist between intersections, and were compared to existing volumes for accuracy.

All future scenarios assumed 100% build-out of PGD's prescribed land uses. *Figure 8* contains the Year 2020 forecast traffic volumes.

Intersection capacity analyses were conducted for the study intersections under Year 2020 conditions. *Table 5* reports the intersection operations during peak hour conditions. *Appendix J* contains the calculation sheets. All intersections are calculated to operate at LOS D or better with the exception of:

- Walnut Avenue / Palomar Street—*LOS F-AM and PM peak periods*
- Industrial Boulevard / Palomar Street (at-grade trolley)—*LOS E-PM peak period*

TABLE 5
YEAR 2020 INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Year 2020	
		Delay ^a	LOS ^b	Delay	LOS
1. Walnut Avenue / Palomar Street	AM	>100	F	>100	F
	PM	>100	F	>100	F
2. Industrial Boulevard / Palomar Street (grade-separated trolley) (at-grade trolley) ^c	AM	15.8	B	20.2	C
	PM	20.4	C	32.2	C
	AM	39.8	D	50.2	D
	PM	44.4	D	62.2	E
3. Transit Center Place / Palomar Street	AM	10.3	B	11.4	B
	PM	22.8	C	22.9	C
4. Trolley Center / Palomar Street	AM	8.0	A	9.6	A
	PM	13.4	B	14.6	B
5. Broadway / Palomar Street	AM	22.5	C	23.4	C
	PM	27.3	C	29.6	C
6. Ada Street / Industrial Boulevard ^d	AM	0.18 ^d	A	0.23 ^d	A
	PM	0.33 ^d	A	0.35 ^d	A

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. 24 and 30 seconds of delay added to the existing and Year 2020 scenarios, respectively, to account for the trolley crossing which occurs at this intersection. *Appendix G* contains further explanation of this methodology.
- d. Synchro does not present vehicular delays at roundabouts. Therefore, maximum volume to capacity ratio is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Street segment analyses were conducted for roadways in the study area for the Year 2020 scenario. **Table 6** reports Year 2020 street segment operations on a daily basis. As seen in *Table 6*, all street segments are calculated to operate at LOS D or better, with the exception of the following:

- Palomar Street: Walnut Avenue to Industrial Boulevard (at-grade trolley) —*LOS E*
- Palomar Street: Industrial Boulevard to Transit Center Place (at-grade trolley) —*LOS E*

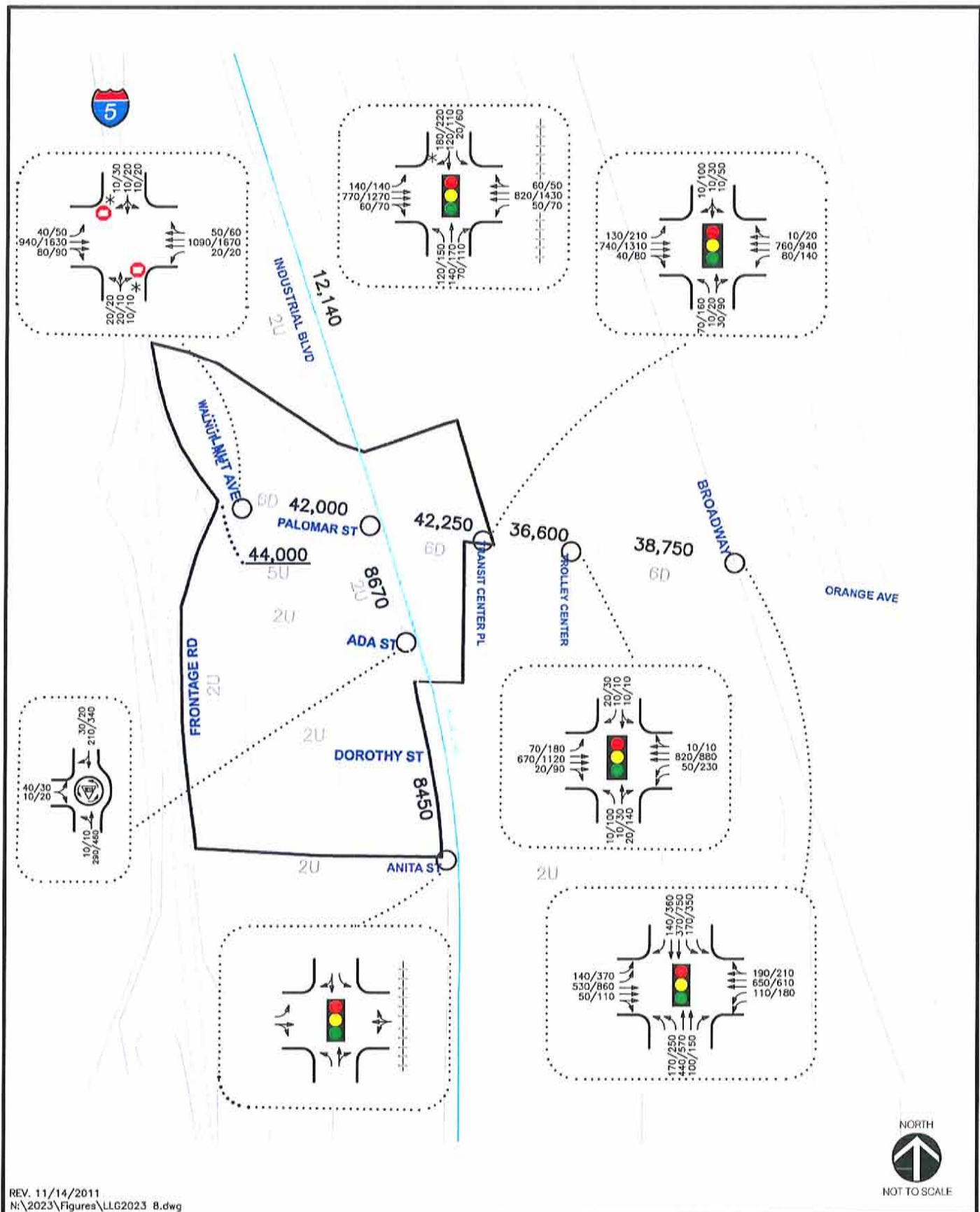
Due to the conflicts of at-grade trolley with vehicular traffic in this corridor, poor street segment operations are calculated in the Year 2020. As trolley and vehicular traffic demands increase with time, operations on Palomar Street will continue to degrade.

TABLE 6
YEAR 2020 STREET SEGMENT OPERATIONS

Street Segment	Buildout Capacity (LOS C) ^a	Existing			Year 2020		
		ADT ^b	V/C ^c	LOS ^d	ADT	V/C	LOS
Palomar Street							
I-5 to Walnut Avenue	40,000 ^e	41,000	1.171	E	44,000	1.100	D
Walnut Avenue to Industrial Boulevard (<i>grade-separated trolley</i>)	40,000	39,000	0.975	C	42,000	1.050	D
(<i>at-grade trolley</i>)	36,000 ^e	39,000	1.114	D	42,000	1.200	E
Industrial Boulevard to Transit Center Pl. (<i>grade-separated trolley</i>)	40,000	39,200	0.980	C	42,250	1.056	D
(<i>at-grade trolley</i>)	36,000	39,200	1.120	D	42,250	1.207	E
Transit Center Pl. to Trolley Center	40,000	34,900	0.872	B	36,600	0.915	C
Trolley Center to Broadway	40,000	37,000	0.925	C	38,750	0.968	C
Industrial Boulevard							
North of Palomar Street (<i>grade-separated trolley</i>)	12,000 ^g	5,380	0.448	A	9,640	0.803	B
(<i>at-grade trolley</i>)	10,500	5,380	0.512	A	9,640	0.918	C
Palomar Street to Ada Street (<i>grade-separated trolley</i>)	12,000 ^g	6,340	0.528	A	8,670	0.722	A
(<i>at-grade trolley</i>)	10,500	6,340	0.603	A	8,670	0.825	B
Ada Street to Anita Street	12,000 ^f	5,900	0.491	A	8,450	0.704	A

Footnotes:

- a. Roadway classifications based on City of Chula Vista Circulation Plan West. Roadway capacities based on City of Chula Vista Roadway Classification Table shown in *Appendix H*.
- b. Average Daily Traffic.
- c. Level of Service.
- d. Volume to Capacity.
- e. Palomar Street between I-5 and Walnut Avenue classified as a 6-lane Major in the City of Chula Vista Circulation Plan West.
- f. For at-grade crossings, segment capacity has been reduced by 10% to account for trolley crossing delay.
- g. Industrial Boulevard analyzed using the Class II Collector roadway classification thresholds.



Year 2030 Traffic Volumes & Operations

Year 2030 traffic volumes were developed based on a SANDAG Southbay traffic model (Baseline scenario) for Chula Vista. The South bay model was reviewed and verified to include the build-out of the PGD. The Southbay model includes Year 2030 average daily traffic volumes (ADT's). The forecast ADT volumes were then used to calculate peak hour volumes based on the existing relationship between ADT and peak hour volumes. The forecast volumes were also checked for consistency between intersections, where no driveways or roadways exist between intersections, and were compared to existing volumes for accuracy.

All future scenarios assumed 100% build-out of PGD's prescribed land uses. **Figure 9** contains the Year 2030 forecast traffic volumes.

Intersection capacity analyses were conducted for the study intersections under Year 2030 conditions. **Table 7** reports the intersection operations during peak hour conditions. **Appendix K** contains the calculation sheets. All intersections are calculated to operate at LOS D or better with the exception of:

- Walnut Avenue / Palomar Street—*LOS F-AM and PM peak periods*
- Industrial Boulevard / Palomar Street (at-grade trolley)—*LOS E-AM and PM peak periods*

As shown in the table below, with the grade-separated trolley alternative, the Industrial Boulevard/Palomar Street intersection is calculated to operate at LOS D or better. The grade-seperated alternative removes vehicle-trolley conflicts thereby improving vehicular delay and traffic operations on Palomar Street and Industrial Boulevard.

TABLE 7
YEAR 2030 INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Year 2020		Year 2030	
		Delay ^a	LOS ^b	Delay	LOS	Delay	LOS
1. Walnut Avenue / Palomar Street	AM	>100	F	>100	F	>100	F
	PM	>100	F	>100	F	>100	F
2. Industrial Boulevard / Palomar Street (grade-separated trolley) (at-grade trolley) ^c	AM	15.8	B	20.2	C	26.9	C
	PM	20.4	C	32.2	C	40.9	D
	AM	39.8	D	50.2	D	62.9	E
	PM	44.4	D	62.2	E	76.9	E
3. Transit Center Place / Palomar Street	AM	10.3	B	11.4	B	12.2	B
	PM	22.8	C	22.9	C	22.9	C
4. Trolley Center / Palomar Street	AM	8.0	A	9.6	A	11.5	B
	PM	13.4	B	14.6	B	15.9	B
5. Broadway / Palomar Street	AM	22.5	C	23.4	C	25.4	C
	PM	27.3	C	29.6	C	33.8	C
6. Ada Street / Industrial Boulevard	AM	0.18 ^d	A	0.23 ^d	A	0.28 ^d	A
	PM	0.33 ^d	A	0.35 ^d	A	0.42 ^d	B

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. 24, 30 and 36 seconds of delay added to the existing, Year 2020 and Year 2030 scenarios, respectively, to account for the trolley crossing which occurs at this intersection. *Appendix G* contains further explanation of this methodology.
- d. Maximum v/c ratio reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

Street segment analyses were conducted for roadways in the study area for the Year 2030 scenario. **Table 8** reports existing street segment operations on a daily basis. As seen in *Table 8*, the following street segments are calculated to operate at LOS E or F:

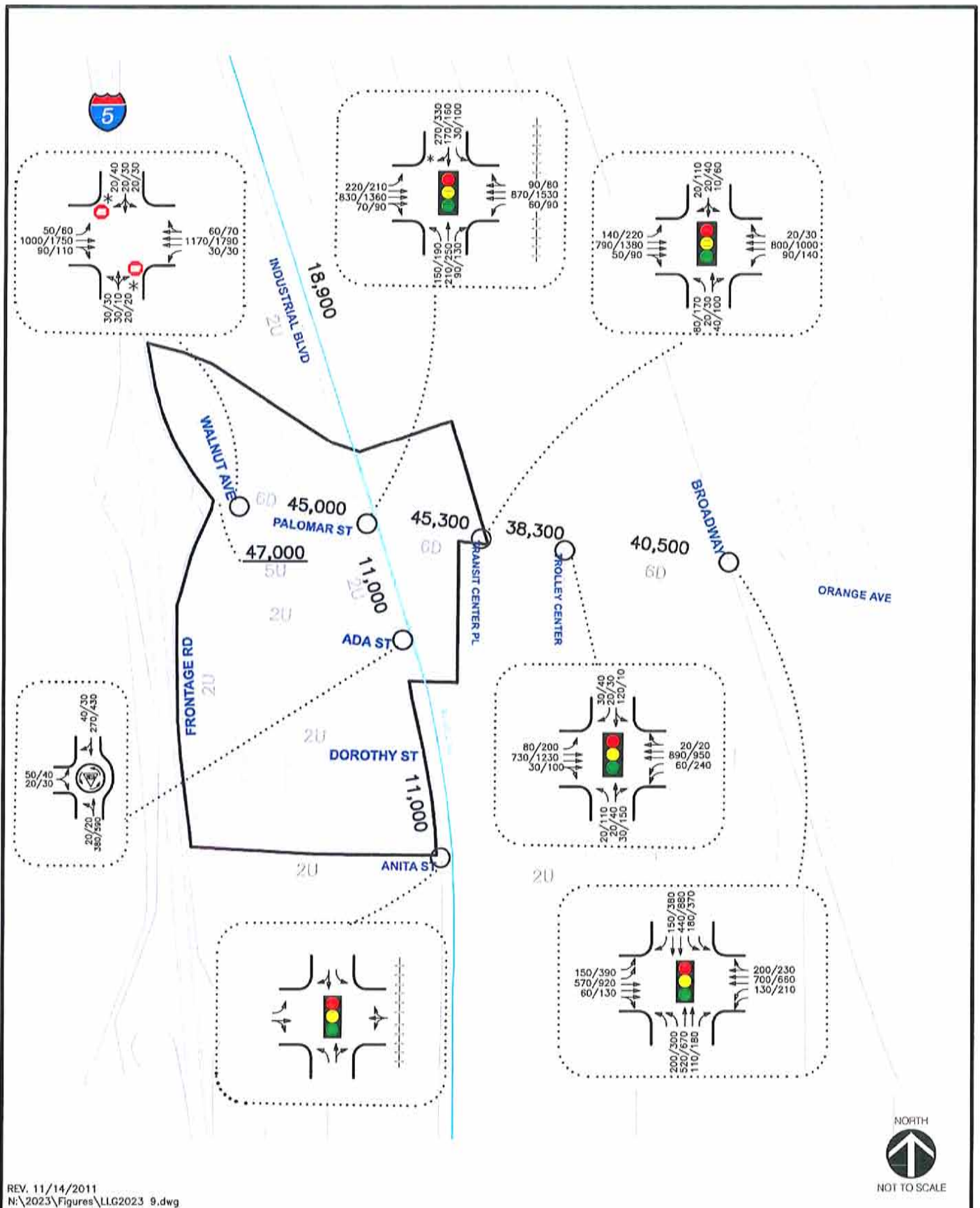
- Palomar Street: I-5 to Walnut Avenue —*LOS E*
- Palomar Street: Walnut Avenue to Industrial Boulevard (at-grade trolley) —*LOS E*
- Palomar Street: Industrial Boulevard to Transit Center Place (grade-separated and at-grade trolley) —*LOS E/F*
- Industrial Boulevard: North of Palomar Street (grade-separated and at-grade trolley) —*LOS E/F* respectively.

TABLE 8
YEAR 2030 STREET SEGMENT OPERATIONS

Street Segment	Buildout Capacity (LOS C) ^a	Existing			Year 2020			Year 2030		
		ADT ^b	V/C ^c	LOS ^d	ADT	V/C	LOS	ADT	V/C	LOS
Palomar Street I-5 to Walnut Ave	40,000 ^e	41,000	1.171	E	44,000	1.100	D	47,000	1.175	E
Walnut Ave to Industrial Blvd (<i>grade-separated trolley</i>) (<i>at-grade trolley</i>)	40,000	39,000	0.975	C	42,000	1.050	D	45,000	1.125	D
	36,000 ^f	39,000	1.114	D	42,000	1.200	E	45,000	1.285	E
Industrial Blvd to Transit Center Place (<i>grade-separated trolley</i>) (<i>at-grade trolley</i>)	40,000	39,200	0.980	C	42,250	1.056	D	45,300	1.132	E
	36,000	39,200	1.120	D	42,250	1.207	E	45,300	1.294	F
Transit Center Place to Trolley Center	40,000	34,900	0.872	B	36,600	0.915	C	38,300	0.957	C
Trolley Center to Broadway	40,000	37,000	0.925	C	38,750	0.968	C	40,500	1.012	D
Industrial Boulevard North of Palomar Street (<i>grade-separated trolley</i>) (<i>at-grade trolley</i>)	12,000 ^g	5,380	0.448	A	9,640	0.803	B	13,900	1.158	E
	10,500	5,380	0.512	A	9,640	0.918	C	13,900	1.323	F
Palomar Street to Ada Street (<i>grade-separated trolley</i>) (<i>at-grade trolley</i>)	12,000 ^g	6,340	0.528	A	8,670	0.722	A	11,000	0.916	C
	10,500	6,340	0.603	A	8,670	0.825	B	11,000	1.047	D
Ada Street to Anita Street	12,000 ^g	5,900	0.491	A	8,450	0.704	A	11,000	0.916	C

Footnotes:

- a. Roadway classifications based on City of Chula Vista Circulation Plan West. Roadway capacities based on City of Chula Vista Roadway Classification Table shown in *Appendix H*.
- b. Average Daily Traffic.
- c. Level of Service.
- d. Volume to Capacity.
- e. Palomar Street between I-5 and Walnut Avenue classified as a 6-lane Major in the City of Chula Vista Circulation Plan West.
- f. For at-grade crossings, segment capacity has been reduced by 10% to account for trolley crossing delay.
- g. Industrial Boulevard analyzed using the Class II Collector roadway classification thresholds.



Motorized Travel Deficiencies and Recommended Improvements

The following section discusses the recommended transportation improvements that met the study objectives and guiding principles of the project, which can be succinctly expressed as improving overall mobility. Improvements prove especially challenging balancing both motorized and non-motorized travel.

Analysis of the study area motorized facilities under baseline and future conditions revealed transportation deficiencies resulting in facilities operating at LOS E or F. The recommendations presented in this section improve deficient facilities to achieve an acceptable LOS (LOS D or better) wherever possible. It is recommended that the City of Chula Vista identify improvements that promote mobility for all modes of travel.

In order to test the recommendations, the analysis was re-run with the improvements in place for the most critical Year 2030 scenario to meet CEQA requirements.

INTERSECTION IMPROVEMENTS

Table 9 summarizes the deficient intersection operations with the improvements in place.

Walnut Avenue / Palomar Street: This intersection shows deficient operations in Year 2020 and Year 2030 scenarios. The study recommends providing a raised median across the intersection and reconfiguring Walnut Avenue to a right-in / right-out configuration. This improvement is recommended to enhance safety by restricting minor street left-turn movements from Walnut Avenue across high-speed multiple-lanes of traffic on Palomar Street.

As left-turns movements are proposed to be restricted at Walnut Avenue/Palomar Street intersection, EB vehicles on Palomar Street intending to turn left at Walnut Avenue will need to make u-turns at the Palomar Street/ Industrial Boulevard intersection. Similar westbound left-turning vehicles to Walnut Avenue would be required to make a left-turn at the Palomar Street/ Industrial Boulevard intersection and turn right on Ada Street. These improvements bring the level of service to acceptable levels.

Industrial Boulevard / Palomar Street: This intersection shows deficient operations in Year 2020 and Year 2030 in the at-grade trolley crossing alternative only. The following improvements are recommended to achieve LOS D or better:

- Grade-separate the rail crossing to improve automobile operations. This would result in no additional vehicular delay during a trolley crossing. With the grade-separation, the intersection is calculated to operate at LOS D or better. Grade-separation would also eliminate vehicle, pedestrian and bicycle conflicts with the trolley.
- Change the left-turn lane signal phasing from permitted-protected to protected at all approaches to improve safety.

Transit Center Place/ Palomar Street: Despite this intersection not calculating as deficient, the following improvements are recommended to improve intersection operations, pedestrian access and safety based on field observations.

- Realign the north leg of the Transit Center Place/ Palomar Street intersection to align with the south leg which would eliminate intersection offset. This improvement is also intended to benefit pedestrians by allowing shorter walking distances.
- Install pavement markings after realignment on the north leg showing exclusive left-turn lane and shared through-right lanes. This will formalize the intersection configuration and improve operations.

Appendix L contains the intersection calculation sheets with improvements.

TABLE 9
INTERSECTION OPERATIONS WITH IMPROVEMENTS

Intersection	Peak Period	Year 2030 without Improvements		Year 2030 with Improvements		Improvements
		Delay ^a	LOS ^b	Delay	LOS	
1. Walnut Avenue / Palomar Street	AM	>100	F	14.9	B	Reconfigure intersection to provide right-in/right-out only.
	PM	>100	F	24.9	C	
2. Industrial Boulevard / Palomar Street	AM	62.9	E	26.9	C	Trolley grade-separation and protected phasing
	PM	76.9	E	40.9	D	

Footnotes:

a. Delay – measured in seconds.

b. LOS – Level of Service.

STREET SEGMENT IMPROVEMENTS

The following improvements are recommended to improve mobility at deficient roadway segments in the study area. *Table 10* lists these improvements.

Palomar Street – I-5 to Walnut Avenue: To enhance segment capacity and improve safety on Palomar Street, the study recommends providing a raised median across the Walnut Avenue/Palomar Street intersection. This improvement is recommended to enhance safety by restricting minor street left-turn movements from Walnut Avenue across multiple-lanes of traffic on Palomar Street. Reconfigure Walnut Avenue to a right-in / right-out configuration. With this proposed improvement, this segment would calculate to operate at LOS C.

As a long-term improvement, a connecting roadway (north of Palomar Street) between Walnut Avenue and Industrial Boulevard is also recommended. This improvement would relieve congestion on Palomar Street and load traffic onto Industrial Boulevard thereby enhancing the capacity and throughput of Palomar Street. The new connecting roadway is envisioned to be a 2-lane Local Collector with sidewalks and parking on both sides.

Palomar Street –Walnut Avenue to Industrial Boulevard: This segment is calculated to operate deficiently in the at-grade trolley alternative only. To mitigate this deficiency, it is recommended to grade-separate the trolley crossing to achieve maximum throughput and capacity on Palomar Street. With the grade-separation, this segment is calculated to operate at LOS D.

Palomar Street – Industrial Boulevard to Transit Center Place: To mitigate the deficiency to this segment, it is recommended to grade-separate the trolley crossing to achieve maximum throughput and capacity on Palomar Street. With the grade-separation, this segment is calculated to operate at LOS D.

Industrial Boulevard – North of Palomar Street: No improvements are proposed to this segment. Given the right-of-way constraints with the adjoining trolley tracks, widening of Industrial Boulevard to include a two-way left-turn lane to meet Class I Collector standards or widening to 4-lanes may not be feasible. Such improvement would also not be consistent with the City of Chula Vista General Plan Circulation Element. The widening may also negatively influence the character, quality, and livability of the community with loss of parking, reduction in pedestrian and bicycle friendliness, and compromised safety. This segment would remain deficient. The project would proceed with a statement of findings of infeasibility and/or over-riding considerations, detailing why this deficiency should not be fully mitigated.

TABLE 10
STREET SEGMENT OPERATIONS WITH IMPROVEMENTS

Deficient Street Segments	Year 2030 without Improvements				Year 2030 with Improvements				Improvements
	Capacity (LOS C) ^a	ADT ^b	V/C ^d	LOS	Capacity (LOS C)	ADT	V/C	LOS	
Palomar Street									
1-5 to Walnut Ave.	40,000	47,000	1.175	E	50,000	47,000	0.940	C	Install a median on Palomar Street to enhance capacity
Walnut Avenue to Industrial Blvd (at-grade trolley)	36,000	45,000	1.285	E	40,000	45,000	1.125	D	Trolley grade-separation
Industrial Blvd to Transit Center Pl. (at-grade trolley)	36,000	45,300	1.294	F	45,000	45,300	1.006	D	Trolley grade-separation
Industrial Boulevard									
North of Palomar Street (at-grade trolley)	10,500	13,900	1.323	F	10,500	13,900	1.323	F	No improvements proposed due to right-of-way constraints

Footnotes:

- a. Capacity based on *City of Chula Vista's* roadway classification operating at LOS E.
- b. Average Daily Traffic.
- c. Level of Service.
- d. Volume to Capacity.